DOCUMENT RESUME

ED 431 236 EA 029 884

AUTHOR	Cheng, Yin Cheong; Cheung, Wing Ming
TITLE	Education Quality Profile: The Case of Hong Kong Secondary Schools.
PUB DATE	1999-04-00
NOTE	48p.; Paper presented at the Annual Meeting of the American Educational Research Association (Montreal, Quebec, Canada, April 19-23, 1999).
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Case Studies; *Educational Attitudes; Educational Quality; Effective Schools Research; Excellence in Education; Foreign Countries; Models; *School Effectiveness; Secondary Education
IDENTIFIERS	*Hong Kong

ABSTRACT

This paper draws on the opinions of principals, teachers, and students regarding the state of education in Hong Kong. It examines the conceptualization of education quality in schools and introduces a multilevel and multi-indicator framework. The text profiles indicators of student attitudes, student satisfaction, negative feelings, and attainment test results. It discusses aspects of classroom climate, as well as teachers' job satisfaction, job attitudes, efficacy, professionalism, and social norms. Indicators at the organizational level are also presented, including strength of organizational culture, organizational effectiveness, principal-teacher relationships, principal leadership, and school-improvement needs. The document relates the results of several studies that analyzed school effectiveness. The findings indicate that the established norms of education quality in Hong Kong's secondary schools provide a feasible and useful instrument that can serve the purposes of monitoring education quality in school for both internal development and external accountability. If it can be accepted that education quality reflects the overall performance of school members and that the organizational level can be indicated by the satisfaction perception, and performance of students, teachers, and principals, then the findings of the studies can provide the comprehensive information needed to develop the schools further. (Contains 78 references, 6 figures, and 5 tables of statistical results.) (RJM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 431 236

Education Quality Profile: The Case of Hong Kong Secondary Schools

Yin Cheong CHENG & Wing Ming CHEUNG

Centre for Research and International Collaboration
Hong Kong Institute of Education

Lo Ping Rd., Tai Po, NT
HONG KONG

Fax: (852) 2948-7721
Email: yccheng@ied.edu.hk

Paper presented at the Annual Conference of the
America Educational Research Association

19-24 April, 1999

Montreal, Canada

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
✓ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY
Y C. Cheng
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
2B

Acknowledgment

The principal investigator would like to thank the Research Grants Council of the Universities Grants Committee of the Hong Kong Government for their award of the Earmarked Research Grant to support this research project on education quality in Hong Kong primary and secondary schools.

EA029 884

BEST COPY AVAILABLE

Introduction

Since 1980s, Hong Kong has developed very quickly in nearly every aspect of the society. Responding to the rapid changes and developments of the society, the school system has been expanded largely and a number of policy efforts have been made to improve different aspects of education such as curriculum, language education, student guidance, student streaming, management, teacher-student ratio, physical environment, and teacher education (Education Commission, 1984-1996). These educational reforms in Hong Kong raise some critical issues in school management and educational policy making:

(1) " *How Good* ?" After the rapid expansion of school system in the past decades, the Hong Kong government is now aware of the importance of quality of education as well as the potential damage to quality due to poor management existing in schools. The Education & Manpower Branch and Education Department (1991) had issued a policy entitled " School Management Initiative" inducing a great reform of management in Hong Kong aided schools. Although this policy aims at discharging accountability and improving quality of education, it suffers from lack of a system of indicators of education quality for monitoring and evaluating school performance (Education Commission, 1997; Cheng, 1995, 1997a). Without a comprehensive system of indicators, up to now we do not know how good our schools are. It is a very serious problem when compared with the huge investment in our school system.

(2) "*How to Improve*? " Due to the rapid change of our society, the role of schools becomes very complicated and demanding. Many people worry whether the traditional management style and educational process in many schools are effective for education and implementation of new programs. What are the characteristics of administrative and organizational processes in our schools? What are the links between organizational factors and quality of education in schools? How should the administrative and organizational processes in schools be adapted to the new roles? All these questions intend to search how to improve quality of education through organizational change and development in school. Unfortunately, we know very little because there are very few studies in the context of Hong Kong (Cheng, in press a).

(3) " *Schools as Black Boxes* ? " Compared with other countries, the primary and secondary schools seem to be black boxes in Hong Kong in past decades. Very few systematic research has been done in the area of educational administration, and organizational process in Hong Kong schools. There is lack of knowledge base to support improvement of school practice and enhancement of education quality in Hong Kong.

(4) " *How to Ensure Accountability* ?" Currently, there is a great demand for accountability of education quality in schools from the public and policy-makers. Nearly no research has been done on indicators of education quality and their determinants in both Hong Kong primary and secondary schools. This blank area is hindering any effort for ensuring and improving quality of education provided in both primary and secondary schools.

Some other rapidly developing societies in the Asia-Pacific areas are facing similar problems of education quality in development of education (Cheng, in press, b).

Currently there are also movements of effective schools, school-based management, and educational reforms in search of education quality in developed countries such as U.S.A., U.K., and Australia (Cheng, 1993b, 1994a, 1996a). There is a strong need to understand, monitor, and enhance education quality not only in some developing areas but also in some developed countries.

Responding to the above needs and issues, the objectives of this project are as follows:

1. To develop a system of indicators that can provide information to describe the performance and enduring features of Hong Kong secondary schools, monitor education quality, diagnose schooling process, and inform school management and policy-making;

2. To study the relationship of student educational performance to process characteristics at the school level and classroom-level; specifically, to investigate the organizational determinants (i.e. manipulable factors) of education quality in order to provide information and insight for improvement and development in Hong Kong secondary schools.

The findings can make contribution to monitoring and evaluating quality of schooling for public accountability, developing policy options, school-based review and improvement in the context of local schools, and hopefully to the current educational reforms for education quality and effective schools in international communities and the advancement of knowledge in the field of educational management and effectiveness .

Conceptualization of Education Quality in School

To different people, the definition of education quality may be different and so the indicators used to describe education quality may be different (Hughes, 1988; Fuller, 1986; Cheng, 1995, 1997a). Some may emphasize the quality of inputs to the education systems but the other on the quality of processes and outcomes. The definition of education quality may be associated with the fitness for use (Juran, 1988), the satisfaction of strategic constituencies' (e.g. policy-makers, parents, school management committee, teachers, students, etc.) needs, or the conformance to strategic constituencies' requirements and expectations (Crosby, 1979). According to the ideas of total quality management (Tenner & Detoro, 1992) and system approach, education quality may be defined as "the character of the set of elements in the input, process, and output of the education system that provides services that completely satisfy both internal and external strategic constituencies by meeting their explicit and implicit expectations" (Cheng, 1995).

Since the conception of education quality involves the input, process, output and multiple constituencies of an education system, it is multi-dimensional and cannot be easily assessed by only one indicator. Furthermore, the expectations of different constituencies on education may be very different, if not contradictory. It is often difficult for a school or an education institute to meet all the expectations or needs at the same time. Therefore, it is not rare that the education quality of a school is high to the perceptions of some constituencies but not to the other, or, some aspects of a school may be high quality but the other aspects may be low quality (Hughes, 1988). In order to assess education quality, different indicators

may be developed to give information about the performance of an education system in different aspects. Education quality indicator may be defined as the indicator used to describe the key aspects of education quality in input, process, & outcome at the school level or at the system level. The difference in the choice of and the emphasis on indicators may reflect the diverse interests and expectations among the concerned constituencies (Cheng, 1997a).

Currently, there is strong interest in the international comparison of the functioning of educational systems and the development of international education indicators for planning and monitoring the education systems. Nuttall (1990), Herpen (1989), and Bottani (1991) can provide the information about the OCED (Organization for Economic Co-operation and Development) International Education Indicators at the system level. In April 1997, the Asia-Pacific Economic Cooperation (APEC) Education Forum organized an international symposuim on school-based indicators of effectiveness in Quilin China to discuss the issues and experiences identified by APEC country members in developing a common framework at the school and system levels for monitoring and evaluating school effectiveness and education quality. The principal investigator of this research project, Y.C. Cheng had been invited to conduct two key presentations on the theoretical aspect and major research findings of this project to the delegations of APEC members (Cheng, 1997a, b).

According to Scheerens (1990) and Herpen (1989), the development of education indicators seems to have experienced three trends. The first trend was the transition from social indicators of education (i.e. used to describe the educational aspect of the population) to education indicators used to describe some characteristics (mainly input and resource measures) of education systems. The second trend was the shift towards more comprehensive indicator systems by adding output and context measures and growing interest in manipulable factors and process characteristics. The third trend was more concerned with process characteristics in schools and therefore was to measure data at more than one aggregation level (i.e. national, school, classrooms, students, etc.). Up to now there seems to be no universal set of education indicators that is appropriate for all purposes of different regions or countries.

Since we are more interested in education improvement and school effectiveness, the development of education quality indicators may be in light of the third trend, and focuses more on the process characteristics. In this project, the literature that contributed to the development of a system of indicators of education quality may be divided into three categories:

(1) the previous studies on education indicators, performance indicators, quality indicators, and accountability system indicators, such as Nuttall (1990), Windham (1988), Oakes (1986), Benveniste (1987), Scheerens (1990), and Hopkins & Leask (1989);

(2) the studies on school effectiveness and instructional research, such as Wilson & Corcoran (1988), Mortimore (1993), Wang & Walberg (1991), Kyle (1985), and Brophy & Good (1986); and

(3) the studies on organizational effectiveness (such as Cameron & Whetten, 1983).

A Multi-level and Multi-indicator Framework

Based on the above theoretical consideration and literature support, a preliminary framework including multi-levels and multi-indicators was developed to assess education quality in schools. In the light of the current trend of education indicator development, the framework was more concerned with process characteristics in schools and the selection of multi-indicators was based on the previous studies on education indicators, school effectiveness, instructional research, organizational effectiveness, and school management. The collection of data was conducted at more than one aggregation level. It was hoped that the framework can be carried out in form of both school self evaluation and external evaluation and serves the purposes of both internal development and external accountability.

Specifically in this framework, education quality in school is defined by the following characteristics:

(1) it represents the overall performance of school members at the individual level, the group level, and the organizational level;
(2) it includes the affective, cognitive, and behavioral components of performance; and
(3) it can be indicated by the satisfaction, perception, and performance of the key school actors.

Based on this conception and the past studies, the preliminary framework included the individual and group levels of students, the individual and group levels of teachers, and the school organizational level. At the student individual level, indicators were students' affective and academic performance. At the student group level, the indicators were classroom's human and physical environment and classroom management. The teacher individual level included indicators of job attitudes, satisfaction, and beliefs. The teacher group level included indicators of social norms and professionalism. At the organizational level, the indicators were organizational culture, structure, effectiveness, quality of school physical environment, principal-teachers relationship, leadership, and need for school improvement.

In sum, the preliminary framework was rather comprehensive and the relevance, validity, and reliability of most selected indicators were supported by the research evidence in the past studies. This preliminary framework was further developed through the case studies and two surveys of the research project. The major indicators of the framework are illustrated as follows:

Indicators at the Student Individual Level:

a. Indicators of Student Attitudes: They are the levels of positive attitudes put towards self, peers, teachers, the school, and learning. These indicators were developed and tested in this project.

- Self concept
- Attitude to peers
- Attitude to teachers
- Attitude to the school
- Attitude to learning
- Attitude Index (=(self+peers+teachers+school+learning)/5)

b. Student Satisfactions: They are the extents to which the student is satisfied with different aspects of school life; They were developed from the literature of quality of work life and organizational behavior (Cammann, et al., 1983; Oldham & Hackman, 1981).

- Social satisfaction (i.e. with social relations in school)
- Intrinsic satisfaction (i.e. with opportunities to perform & learn)
- Extrinsic satisfaction (i.e. with school arrangements)
- Overall satisfaction (i.e. with the learning life in school)
- Satisfaction Index (=(social+intrinsic+extrinsic+overall)/4)

c. Negative Feelings: They are negative indicators of student feelings about learning and the school; They were developed in this education quality research project:

- Feeling of homework overload (-)
- Intention to dropout (-)

d. Attainment Test Results: They are academic indicators got from results of a set of tests developed specifically for secondary schools on the following subjects:

- Chinese
- English
- Mathematics

Indicators at the Classroom Level:

a. Indicators of Classroom Climate: They are indicators of social climate among students and between students and teacher in classroom; They were adapted from Moos & Tricketts (1974) and had been used widely in different areas and countries, including the following nine indicators:

<among students>

- Affiliation (i.e. the level of friendship students feel for each other)
- Order and Organization (i.e. the level of students behaving in an orderly and polite manner and classroom activities being well organized)
- Competition (i.e. the level of students competing on academic achievement/recognition)
- Involvement (i.e. the level of students having attentive interest in class activities).

<students-teacher>

- Teacher support (i.e. the amount of teachers' help and concern provided to the students).
- Rule clarity (i.e. the level of teachers demanding on establishing a set of clear rules and being consistent in dealing with students who break rules)
- Task orientation (i.e. the level of teachers completing planned classroom activity).
- Teacher control (i.e. the level of teachers strictly implementing the classroom rules).
- Innovation (i.e. the level of teachers being innovative on teaching methodology).

b. Indicator of Quality of Classroom Physical Environment: This is an overall quality indicator of classroom physical environment in terms of facilities, space, arrangements, neatness, cleanliness, and comfort, perceived by students or teachers; The indicator was developed particularly for this education quality project.

c. Indicators of Classroom Arrangements: They were developed in the education quality project, including:

- Insufficient recess time (-) (i.e. for students' to have a break or go to toilet)

- Ignorance of art, physical education, and music(-) (i.e. replaced by academic subjects)
- Appropriateness of class size (perceived by teachers)
- % time for teaching activities (perceived by teachers)
- % time for student behavior problems (-) (perceived by teachers)

Indicators at the Teacher Individual Level

a. Indicators of Job Satisfaction: They were adapted from the literature of quality of work life (Cammann, et al., 1983; Oldham & Hackman, 1981):

- Social satisfaction (i.e. with the social relationship with colleagues)
- Extrinsic satisfaction (i.e. with the salary or benefits provided)
- Intrinsic satisfaction (i.e. with the opportunities to develop and learn)
- Influence satisfaction (i.e. with the opportunities to participate in decision-making and be autonomous)

b. Indicators of Job Attitudes/Feelings: They were adapted from the literature of quality of work life (Cammann, et al., 1983):

- Commitment to the job (i.e. the level of being committed to the job)
- Job challenge (i.e. the level of feeling challenges in teaching job)
- Job meaning (i.e. the level of feeling that teaching job is meaningful)
- Job responsibility (i.e. the level of feeling responsibility in the job)
- Self-report of effort (i.e. the level of effort put into the job reported by self)

c. Indicators of Teaching Efficacy: They were adapted from Gibson & Dembo (1984), Matthes, Tollerud, & Langeveldt (1989), and Woolfolk & Hoy (1990):

- Personal efficacy (i.e. the belief that personal effort in teaching can improve student learning)
- General efficacy (i.e. the belief that teaching can improve student learning even under the disadvantages from students' families)
- Teaching efficacy (=personal + general)

At Teacher Group Level:

a. Indicators of Social Norms: They are indicators of the social relationship or group feelings among teachers; They were adapted from Halpin (1966) and Halpin & Croft (1963) and had been used widely in different studies (Cheng,1991d; 1993c):

- Intimacy (i.e. the close social relationship among teachers)
- Esprit (i.e. the working morale of teachers)
- Disengagement (-) (i.e. the level of teachers being disengaged from the school)
- Hindrance (-) (i.e. feeling of being burdened with unnecessary work)

b. Indicator of Teacher Professionalism: This is the tendency of teachers being committed to the professional code; It was developed and used in Cheng (1992b).

c. Indicator of Quality of Physical Environment of Staff Room: This is an overall quality indicator of staff room physical environment in terms of facilities, space,

arrangements, neatness, cleanliness, and comfortability, perceived by teachers; It was developed particularly for this education quality research project.

Indicators at the Organizational Level:

a. Strength of Organizational Culture : It is the strength of sharing values, beliefs, and assumption about school mission, teaching, learning, and management among school members; Based on the idea of Alvesson (1987) and Price and Mueller (1986), it was developed and tested in Cheng (1993c).

b. Indicators of Organizational Structure: They were adapted and developed by Oldham & Hackman (1981) and Hage & Aiken (1967) and had been used in Cheng (1993c):

- Formalization (i.e. the level of school functioning being formalized with clear written policies, procedures, and records)
- Hierarchy of Authority (-) (i.e the level of decision-making being centralized in school)
- Participation (i.e the level of teachers participating in decision-making and planning)

c. Indicator of Organizational Effectiveness : This indicator measures the level of effectiveness of school functioning in terms of productivity, adaptability, and flexibility as perceived by teachers; It was adapted from Mott (1972) and had been used in different studies (Cheng, 1991c, 1993c).

d. Indicator of Quality of School Physical Environment: This is an overall indicator of quality of school physical environment in terms of facilities, space arrangements, neatness, being planted, cleanliness, and comfort, as perceived by students or teachers; It was developed particularly for this education quality research project.

e. Indicator of Principal-teachers Relationship : The indicator describes the degree of satisfaction with the social and working relationship between principal-teachers, perceived by teachers; It was developed in the Chan, Cheng, & Hau (1991).

f. Indicators of Principal's Leadership: Based on Bolman & Deal (1991) and Sergiovanni (1984), they were developed and used in this project.

- Human Leadership (i.e. the extent to which the principal is supportive and fosters participation)
- Structural Leadership (i.e. the extent to which the principal thinks clearly and logically, develops clear goals and policies, and holds people accountable for results)
- Political Leadership (i.e. the extent to which the principal is persuasive and effective at building alliances and support and solving conflicts)
- Symbolic Leadership (i.e. the extent to which the principal is inspirational and charismatic)
- Educational Leadership (i.e. the extent to which the principal emphasizes and encourages professional development and teaching improvement)

g. Indicator of School Improvement Need: This indicator assesses the need for improvement in 15 aspects of school functioning such as parental support, quality of student input, instructional resources, physical environment and facilities, staff professional development, morale, student performance, decision participation, teacher appraisal, and administrative procedures and management; The indicator was developed in a school management reform research project (Cheng, 1992a).

The psychometric properties of the above indicators have been tested and documented in the past studies or pilot studies for secondary schools, as shown in Table 1. Each of them may include one to a few of questionnaire items.

Table 1 Psychometric Properties of Education Quality Indicators for Secondary Schools

INSTRUMENT	SOURCE	No. of Items	No. of response cate-gories	No. of cases (Sec)	Estimated reliability by present study* (Sec)
Student attitudes					
Self concept	Developed in this project	9	5	2827	0.7595
Attitude to peers	-- ditto --	5	5	2827	0.7383
Attitude to schools	-- ditto --	6	5	2827	0.8044
Attitude to teachers	-- ditto --	5	5	2827	0.7648
Attitude to learn	-- ditto --	10	5	2827	0.7109
Student satisfactions					
Social satisfaction	Cammann, et at. (1983); Oldman & Hackman (1981)	3	5	2781	0.8093
Intrinsic satisfaction	-- ditto --	3	5	2781	0.6272
Extrinsic satisfaction	-- ditto --	3	5	2781	0.7939
Overall satisfaction	-- ditto --	1	5	-	-
Negative feelings					
Feeling of homework overload (-)	Developed in this project	1	5	-	-
Intention to dropout (-)	-- ditto --	1	5	-	-
Classroom climate (among students)					
Affiliation	Moos & Tricket (1974)	4	5	2781	0.7271
Order and organisation	-- ditto --	4	5	2781	0.7760
Competition	-- ditto --	4	5	2781	0.3724
Involvement	-- ditto --	4	5	2781	0.6824
Classroom climate (students-teachers)					
Teacher support	-- ditto --	4	5	2734	0.7821
Rule clarity	-- ditto --	5	5	2734	0.5017
Task orientation	-- ditto --	3	5	2734	0.5669
Teacher control	-- ditto --	3	5	2734	0.5556
Innovation	-- ditto --	5	5	2734	0.7589
Quality of classroom physical environment					
Classroom Quality (S)	Developed in this project	11	5	2827	0.6831
Classroom Quality (T)	-- ditto --	11	5	508	0.8097

* The instruments were tested using reliability analysis based on the random sample of primary and secondary schools

INSTRUMENT	SOURCE	No. of Items	No. of response cate-gories	No. of cases (Sec)	Estimated reliability by present study* (Sec)
Insufficient of recess time (-)	Developed in this project	1	5	-	-
Ignorance of art, PE and music (-)	-- ditto --	1	5	-	-
Appropriateness of class size	-- ditto --	1	5	-	-
% time for teaching activities	-- ditto --	1	5	-	-
% time for student behavior (-)	-- ditto --	1	5	-	-
Job satisfaction					
Social satisfaction	Cammann, et at. (1983); Oldman & Hackman (1981)	3	7	508	0.8349
Extrinsic satisfaction	-- ditto --	3	7	508	0.5337
Intrinsic satisfaction	-- ditto --	3	7	508	0.7777
Influence satisfaction	-- ditto --	2	7	508	0.5512
Job attitude/feelings					
Commitment to job	Cammann, et at. (1983)	2	7	519	0.8181
Job challenge	-- ditto --	3	7	519	0.5467
Job meaning	-- ditto --	3	7	519	0.7186
Job responsibility	-- ditto --	2	7	519	0.8887
Self-report of effort	-- ditto --	1	7	-	-
Teaching Efficacy					
Personal efficacy	Gibson & Dembo (1984); Matthes, Tollerud & Langeveldt (1989); Woolfolk & Hoy (1990)	8	5	396	0.6938
General efficacy	-- ditto --	6	5	396	0.6183

* The instruments were tested using reliability analysis based on the random sample of primary and secondary schools.

INSTRUMENT	SOURCE	No of Items	No. of response cate-gories	No. of cases (Sec)	Estimated reliability by present study* (Sec)
Social norms					
Intimacy	Halpin & Croft (1963)	6	7	519	0.7690
Esprit	-- ditto --	5	7	519	0.7411
Disengagement (-)	-- ditto --	5	7	519	0.7654
Hindrance (-)	-- ditto --	5	7	519	0.7123
Professionalism	Cheng (1992b)	17	7	519	0.9396
Staff room quality	Developed in this project	7	5	508	0.7328
Organisational Culture	Cheng (1993c)	10	5	396	0.8520
Organisational Structure					
Formalization	Oldman & Hackman (1981); Hage & Aiken (1967)	4	7	519	0.7224
Hierarchy of authority	-- ditto --	2	7	519	0.7829
Participation	-- ditto --	4	7	519	0.7801
Organizational effectiveness	Mott (1972)	8	5	396	0.8233
Quality of school physical environment					
School quality (S)	Developed in this project	8	5	2827	0.6831
School quality (T)	-- ditto --	8	5	508	0.8097
Parent-teachers relationship	Chan, Cheng, & Hau (1991)	10	7	396	0.9338
Principal's leadership					
Human leadership	Developed in this project	7	7	244	0.9217
Structural leadership	-- ditto --	7	7	244	0.8939
Political leadership	-- ditto --	6	7	244	0.9333
Symbolic leadership	-- ditto --	6	7	244	0.8335
Educational leadership	-- ditto --	5	7	244	0.8939
Need for school improvement	Cheng (1992a)	15	7	519	0.9090

* The instruments were tested using reliability analysis based on the random sample of primary and secondary schools.

School Contextual Indicators

In addition to the above indicators, there are also some indicators about the demographic characteristics of principals, teachers, students, the school and the community, the school's administrative structure, financial management, personnel administration, curriculum and instruction, extra-curricular activities, external relations, discipline and regulations, and communications. Since most of the Hong Kong schools are aided schools, they were established and operated on the basis of the Codes of Aid issued by the Education Department of the Hong Kong Government. The sample of schools were relatively homogeneous in input quality in terms of salary structure, professional qualification of teachers and administrators, promotion structure, teacher-class ratios, school facilities, formal curricula to be completed, public examination system, supporting personnel (such as technical, clerical, cleaning staff), formal opportunities of professional training and development, and supervision by the Hong Kong Education Department (Education Ordinance, 1972). Therefore, the framework of education quality developed in this study did not emphasize the quality of input that is often standardized in Hong Kong secondary schools, but it was more concerned with the quality of process and outcome.

Research Methodology

In-depth Case studies (Sept. 1994 - Dec. 1994):

Based on the findings of principal investigator's previous study on organizational culture and effectiveness in a sample of 54 aided secondary schools in Hong Kong (Cheng, 1993c), two secondary schools with contrastingly different characteristics particularly in terms of organizational and educational process, and outputs were selected for case studies. In these studies, the proposed conceptual model of education indicators for this project that was originally based on the previous similar project on primary schools and the previous organizational culture and effectiveness in secondary schools (Cheng, 1993c), had been preliminarily validated and slightly adapted. The proposed system of indicators of school's contextual factors (including the external and internal environments), resource inputs, teachers' characteristics, students' characteristics, principals' characteristics, administrative structures, organizational processes (including decision-making, leadership, interpersonal relationship, organizational culture, etc.), instructional processes (including attitudinal and behavioral measures at the individual level (i.e. teachers, students) and the classroom level, quality of teachers' work life and students' school life, and educational outputs (including achievement measures, attitude measures and satisfaction measures) were examined, tested and adapted through school observations, interviews with principals and teachers, and questionnaire survey. It was found that some contextual and organizational factors of secondary schools are different from that of primary schools and some process and outcome indicators may be appropriate to primary schools but not to secondary schools. Therefore, the framework of indicators had been adapted with the insights from the case studies.

Main Study

The main study included two surveys in a period from January 1995 to May 1996.

a) The First Survey (February 1995 -- May 1995):

Based on the findings of the primary school project, the effectiveness project (Cheng, 1993c) and the in-depth case studies, a set of 9 questionnaires (1 for principal, 1 for discipline master, 1 for prefect of studies, 3 for teachers and 3 for students) had been developed for the survey. 34 aided or government secondary schools (nearly 7.76 % of the secondary school population), 122 classes, 1,041 teachers, and 4,529 students of Form 4 had been involved in this project. It was a convenient sample of schools. Within each sampled school, in addition to the principal, discipline master and prefect of studies, nearly all teachers, about 4 classes of Form 4 (approximately 146 students) were invited to complete the questionnaires. In order to maximize the variety of variables (i.e. number of different indicators), cut down the time for completing the questionnaires, and minimize response set, the teachers and students in each school were divided into three groups respectively and each group had completed different sets of questionnaires. The student questionnaires included the measures on academic achievement on Chinese Language, English Language, and Mathematics.

b) The Secondary Survey: (November 1995 - March 1996)

From the findings of the first survey, the conceptual model of education indicators had been re-examined. The model and the instruments seemed to be quite reliable. The set of questionnaires for the first survey were re-used with very slight adaptation in the second major survey. The method and procedures of the second survey were similar as in the first survey except the sampling method of secondary schools. Through stratified random sampling according to school districts, 57 secondary schools were selected from the secondary school population. The sample size seemed to be appropriate (about 13% of the population) to map the norms of education quality of the secondary schools. The data of this random sample were used to provide an overall norm of education quality in Hong Kong secondary schools and to analyze the organizational determinants of education quality. The numbers of primary schools, classes, principals, discipline master, prefect of studies, teachers, and students sampled in these two surveys were summarized in Table 2. A total of 245 classes, 9,001 students of Form 4, 2,025 teachers, 52 principals, 51 discipline master, and 56 prefect of studies had been involved in the second survey.

Two outliers schools with highest and lowest students' educational performance in terms of attitudes, satisfactions, and academic achievements were taken for further examination of their characteristics in profile of school process, organizational determinants, and contextual factors in order to deepen the understanding.

Table 2: Numbers of Schools, Teachers, and Students Sampled in the Surveys

	'95	'96
Total No. of Schools	34	57
Total No. of Class	122	245
Total No. of Teachers	1041 (from 30 schools)	2025 (from 56 schools)
Total No. of Students	4529 (from 31 schools)	9001 (from 56 schools)
Principal	19	52
Discipline Master	25	51
Prefect of Studies	27	56

Quality Profile of Hong Kong Secondary Schools

1. Identifying and Including Contextual Indicators into the Framework

For secondary schools, there were over 130 school's contextual factors that could be potential indicators of education quality in schools. In order to identify which contextual factors are good indicators of education quality in secondary schools, ANOVA and correlational analysis were also used to test how the major contextual factors are related to indicators of classroom process and students' learning performance in the random sample of secondary schools. Finally, 12 contextual factors were found to be potentially good indicators for secondary schools: availability of donation, assessment per year (-ve), extra-curricular activities, percentage of student participation in extra-activities, school participation in external activities, attained awards, school type, language of instruction, number of classrooms, number of classrooms, number of students, teacher-student ratio, and number of class. These contextual factors were included in the framework of education quality indicators for secondary schools.

Comparing the contextual factors chosen as indicators, the set for primary schools is quite different from that for secondary schools. It seems that Hong Kong primary schools have variations in more contextual factors that are important to education quality than secondary schools. The difference may reflect the historical reason of educational development in Hong Kong because Hong Kong has a longer history in developing primary schools that creates variations in the background of schools than in secondary schools. In Hong Kong, the rapid expansion of secondary education was only started from 1970s. Some contextual factors are potentially important to both primary and secondary schools: availability of donation, extra-curricular activities, students' participation in extra-curricular activities, teacher assessment, student-teacher ratio, and number of students.

2. Testing the Stability of the Framework of Education Quality Indicators

A primary test of the stability of the framework of education quality indicators for secondary schools is conducted by mapping and comparing the education quality profiles (in terms of group mean on each indicator) of secondary schools in the first survey (a convenient sample) and second survey (a random sample). The results of profiles are shown in Figure 1.

From this comparison of profiles, we can see that the profile shape of quality indicator as a whole is rather stable even though the two surveys were conducted on different samples. Most indicators are stable except for a few indicators such as teachers' professionalism, hindrance, disengagement, feelings of challenge, classroom environment, class rule clarity and students' feeling of homework overload. As a whole, the results provide considerable evidence to support the stability of the framework.

BEST COPY AVAILABLE

3. The Education Quality Profiles of Hong Kong Secondary Schools: The Norms

Based on the random samples of secondary schools, the education quality profiles of Hong Kong secondary schools were mapped respectively by the following approaches:

- **By Means**: The transformed means (range from 0-100 with 50 as neutral point) of random sample on quality indicators of school process and outcome are used to plot the education profile, as shown in Figure 2 for secondary schools. The profile can provide an overview of the comparative strengths and weaknesses of education quality in process and outcome of Hong Kong secondary schools respectively. In general, the higher score on a positive indicator represents the better quality on this aspect. For a negative indicator, the lower score indicates the better quality on this indicator. The score "50" in Figure 2 represents the conceptual mean of the indicator. The profile may serve as a norm for comparison with the profiles of individual schools.

Comparison between Primary and Secondary Schools: By Means

The comparison of the characteristics of education quality profiles of secondary schools with that for primary schools from the previous project can be compared as shown in Figure 3 and Table 3. The following differences can be observed:

(1) The overall shapes (i.e. wave shape) of these two profiles for primary and secondary schools are similar. It seems that the education quality in primary school and secondary schools share some similar basic characteristics.

(2) On many individual indicators, the differences between primary and secondary schools reach significance level ($p<0.05$). As a whole, we can see that comparatively primary students generally have more positive attitudes in school, their classroom climate is more positive even though percentages of time for teaching activities are less, their teachers have more positive work attitudes, their esprit is higher, and perceived organizational culture is strong. To secondary schools, teachers feel more professionalism and their schools are more formalized in operation but less hierarchical in decision making. There are interesting patterns and differences for future study.

- **By % of Schools in High, Satisfactory, and Low Performance**: The sampled secondary schools were classified into high, satisfactory, and low performance on each quality indicators and the percentages of schools in these three categories on each indicator were plotted as in Figures 4 a and 4 b and listed in Tables 4a and 4b for secondary schools. (Please refer to the ends of the figures for the detail of the classification of performance). These two percentage profiles can provide an alternative overview to examine the comparative strengths and weaknesses of education quality of Hong Kong primary and secondary schools respectively. For example, the higher percentages of secondary schools on a positive indicator (or the lower percentages of schools on a negative indicator) represent the better quality of Hong Kong secondary schools as a whole on this indicator. Individual schools can use their own school profiles to compare with this overall high, satisfactory, and low performance profile and then identify their strengths and weaknesses on different indicators. Similarly, each of school sponsoring bodies can do the same thing to identify the strengths and weaknesses of their affiliated schools on different indicators.

BEST COPY AVAILABLE

- **By Distribution of Schools**: According to the raw scores of schools on each indicator, the distribution of schools was plotted as a profile of the indicator. The profiles of sample distribution are shown in in Figure 5 for secondary schools. These profiles can provide another way to observe the achievements of schools on each indicator of education quality. Individual schools can use their own scores on one indicator (e.g. student's attitude index) to find out where they are in the distribution plot of this indicator (i.e. how good they are on this indicator when compared with other schools)

- **By Profiling Characteristics of Effective and Ineffective Schools**: In terms of the composite score of indices of students' attitudes, satisfactions, and academic achievements, a number of effective schools and ineffective schools were identified from in the second survey of the random sample of schools: schools with the composite sorce larger than 1.5 standard deviation as effective schools (10 secondary schools respectively) and schools with the composite less than 1.5 standard deviation as ineffective schools (15 8 secondary schools respectively). The profiles of these two types of schools were plotted by their means on each indicator of process or outcome, as shown in Figure 6 and Table 5 for secondary schools. The profiles of effective and ineffective secondary schools are contrastingly different on many education quality indicators. In general, the effective schools perform better than the Hong Kong norms and much better than ineffective schools on many process and outcome indicators. The profiles can provide a very illustrative description and pattern of the process characteristics of effective schools and ineffective schools that can be used for school development. For secondary schools, individual schools can use their school profiles to compare with these two typical profiles of effective schools and ineffective schools, find out their strengths and weaknesses in school process and plan their school development strategies.

  For secondary schools, classroom climate (in terms of affiliation, order and organization, competition, and involvement), percentages of time in teaching activities, teachers' feeling of job meaning and general teaching efficacy, students' perceived quality of school physical environment and classroom physical environment, and needs for school improvement (-ve) are significant indicators or predictors to differentiate effective and ineffective schools in terms of students' attitudes, satisfactions and academic achievements.

4. Applications of the Hong Kong Norms

As explained above, the education quality profiles mapped by different methods can be used to inform policy making, practical improvement, and school development for individual schools, school sponsoring bodies, and policy bodies. In fact, a number of seminars and presentations had been conducted for school practitioners, policy interest groups, as well as international delegations of the Asia-Pacific Economic Cooperation (APEC) Education Forum to understand and apply the framework and profiles of education quality.

Conclusion

The above study was mainly based on the information provided by the key actors in schools--principals, teachers, and students. Other important school constituencies such as

BEST COPY AVAILABLE

parents, school management committees, the school sponsoring body, and the Education Department had not been surveyed. Of course, this sets one limitation to the findings of the study. Even though a rather comprehensive set of indicators at multiple levels including the individual/class levels of students, the individual/group levels of teachers, and the school organization level had been conceptualized and used to describe education quality of the sample schools, it does not mean all aspects of school process and education process had been included and studied in detail. For example, curriculum, teaching methods, staff development, community relations and services, school-home relations, etc. had not been investigated in detail. With the constraint of resources, inevitably every study has its limitations. The framework can be further developed in future in order to redress these limitations.

If we accept that education quality reflects the overall performance of school members at the individual level, the group level, and the organizational level including affective, cognitive, and behavioral components and can be indicated by the satisfaction, perception, and performance of students, teachers, and principals, the findings of this survey can provide us rather comprehensive information to further develop the schools, administrators, teachers, and students. Particularly, since the framework of education quality and most of the education quality indicators have their roots in the research literature of school management, education effectiveness, and organizational studies, the framework developed in this project would have useful implications for school improvement and development for education quality in Hong Kong primary and secondary schools.

How to monitor and enhance education quality in schools is a major concern in current education reforms in different parts of the world. There may be many approaches to monitoring school education quality. In the light of the recent trend of education indicator development and the advances in school management, educational effectiveness, and educational administration, this research project has developed a framework including multi-levels and multi-indicators to assess education quality in primary and secondary schools respectively. The developed framework is more concerned with process characteristics in schools and is supported by the research evidence from the past studies and the findings of surveys and case studies in this project. Since the framework is rather comprehensive covering a wide range of indicators on major characteristics of school processes (including most organizational determinants) and educational outcomes, it should be helpful to monitoring education quality and improving school effectiveness.

The developed framework and the established norms of education quality in Hong Kong secondary schools provide a feasible and useful instrument that can serve the purposes of monitoring education quality in school for both internal development and external accountability. Furthermore, the development of framework is based on the research literature of education quality, school management, educational effectiveness, and organizational studies not only from the West but also from the East societies. Therefore it is hoped that the findings of this project can contribute to the growing public concern, policy discussion, research conceptualization, and practice on education quality and school development in both local and international contexts. In fact, the numerous papers, conference presentations, consultancy reports, seminars, talks, and workshops produced from this research project are making contribution in this direction.

References*

Achilles, C. M. (1987). A vision for better schools. In W. Greenfield (Ed.), **Instructional leadership: Concepts, issues, and controversies**. Boston: Allyn & Bacon.

Alvesson, M. (1987). Organizations, culture, and ideology. **International Studies of Management and Organizations**. 17(3), 4-18.

Bachman, J. D., Bowers, D. G., & Marcus, P. M. (1968). Bases of supervisory power: A comparative study in five organizational settings. In A. S. Tannenbaum (Ed.), *Control in organizations.* New York: McGraw-Hill.

Beare, H., Caldwell, B. J., & Millikan, R. H. (1989). *Creating an excellent school.* London: Routledge & Kegan Paul.

Benveniste, G. (1987). The Design of school accountability systems. Paper presented at the Washington Conference on Educational Indicators, DC: Washington.

Bolman, L.G. & Deal, T.E. (1991). **Images of leadership**, Occasional Paper. 20 The National Center for Educational Leadership, Cambridge, MA: Harvard University, Graduate School of Education.

Bottani, N. (1991). OCED International Education Indicators. Paper presented at the IEA (International Education Achievements) General Assembly, Enschede, the Netherlands, August.

Brophy, J. & Good, T. L. (1986). Teacher behavior and student achievement. In M.C. Wittrock (ed). **Handbook of research on teaching** (328-375), N.Y.:McMillan.

Brown, D. J. (1990). *Decentralization and school-based management.* London: Falmer Press.

Cammann, C., et al. (1983). Assessing the attitudes and perceptions of organizational members. In S.E. Seashore, et al.(eds), **Assessing organization change** (71-138), NY: John Wiley,.

Cameron, K.S. & Whetten, D.A. (eds) (1983). **Organizational effectiveness: A comparison of multiple models**. N.Y.: Academic Press.

Chan, B., Cheng, Y.C. & Hau, K.T. (1991). **A technical report on the study of principal-teachers relationship in Hong Kong secondary schools**. Hong Kong: The Chinese University of Hong Kong.

Caldwell, B. J. (1990). Educational reform through school-site management: An international perspective on restructuring in education. In S. B. Bacharach (Ed.), **Advances in research and theories of school management and educational policy** (Vol. 1, pp. 303–333). Greenwick, CT: JAI Press.

Caldwell, B. J., & Spinks, J. (1988). **The self-managing school.** Lewes: Falmer Press.

Chapman, J. D. (Ed.). (1990). **School-based decision-making and management**. London: Falmer Press.

Cheng, Y. C. (1986). School effectiveness as related to organizational climate and leadership style. **Educational Research Journal**, *1*, 86–94.

Cheng, Y. C. (1989). Organizational culture: Development of a theoretical framework for organizational research. **Education Journal**, *17* (2), 128–147.

Cheng, Y.C. (1991a) Profiles of organizational culture and effective schools. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago.

Cheng, Y.C. (1991b). The Theory of School-based Management and External Control Management. **Primary Education**, The Chinese University of Hong Kong,
1(1), 3-18..

Cheng, Y.C. (1991c). Leadership Style of Principals and Organizational Process in Hong Kong Secondary Schools. **Journal of Educational Administration**, 29(2), 25-37.

Cheng, Y.C. (1991d). Organizational Environment in Schools: Commitment, Con-trol, Disengagement, and Headless. **Educational Administration Quarterly**, 27 (4), 481-505.

Cheng, Y.C. (1992a). A Preliminary Study of School Management Initiative: Induction and Responses to Management Reform. **Educational Research Journal**, 7, 21-32.

Cheng, Y.C. (1992b). Teachers' professional ethics as related to students' educational outcomes and organizational characteristics. Paper presented at the World Assembly of the International Council on Education for Teaching held in Paris, France, July.

Cheng, Y.C. (1993a). The Conceptualization and Measurement of School Effectiveness: An Organizational Perspective. Paper presented at the Annual Conference of the American Educational Research Association, Atlanta, U.S.A.

Cheng, Y.C. (1993b). The Theory and Characteristics of School-based Management, **International Journal of Educational Management**, 7(6), 6-17.

Cheng, Y.C. (1993c). Profiles of Organizational Culture and Effective Schools. **School Effectiveness and School Improvement**, 4(2), 85-110.

Cheng, Y.C. (1994a). School effectiveness and school-based management: A mechanism for education quality and school improvement. Keynote speech presented at the International Congress for School Effectiveness and Improvement,
January, Melbourne, Australia.

Cheng, Y.C. (1994b). Classroom environment and student affective performance: An effective profile. **Journal of Experimental Education**. 62 (3), 221-239.

Cheng, Y.C. (1994c). Principal's Leadership as A Critical Factor for School Performance: Evidence from Multi-levels of Primary Schools. **School Effectiveness and School Improvement.** 5 (3), 299-317.

Cheng, Y.C. (1994d). Teacher leadership style: A classroom-level study. **Journal of Educational Administration**. 32 (3), 54-71.

Cheng, Y.C. (1995). School Educational Quality: Conceptualization, Monitoring, & Enhancement. In P.K. Siu & P. Tam (eds.), **Quality in Education: Insights from Different Perspectives,** (pp.123-147). Hong Kong: The Hong Kong Educational Research Association.

Cheng, Y.C. (1996a). **School Effectiveness and School-based Management: A Mechanism for Development,** London, U.K.:The Falmer Press, pp.1-203.

Cheng, Y.C. (1996b).**The Pursuit of School Effectiveness: Research, Management and Policy,** Hong Kong: The Hong Kong Institute of Educational Research of the Chinese University of Hong Kong. pp.1-244.

Cheng, Y.C. (1997a). **Monitoring School Effectiveness: Conceptual and Practical Dilemmas in Developing a Framework**. Eugene, OR: ERIC (Educational Resources Information Center) (no. EA 028359). Clearinghouse on Educational Management. (USA). (// Based on the invited speech at the international symposuim on "School-based Indicators of Effectiveness" organized by the Asia-Pacific Economic Cooperation (APEC) Education Forum in Quilin China, April 14-16, 1997, with the full support by Epson Foundation)

Cheng, Y.C. (1997b). **A Framework of Indicators of Education Quality in Hong Kong Primary Schools: Development and Application**. Eugene, OR: ERIC (Educational Resources Information Center) (no. EA

028358). Clearinghouse on Educational Management. (USA). (// Based on the invited speech at the international symposuim on School-based Indicators of Effectiveness" organized by the Asia-Pacific Economic Cooperation (APEC) Education Forum in Quilin China, April 14-16, 1997, with the full support by Epson Foundation)

Cheng, Y.C. (1999a). The Pursuit of School Effectiveness and Educational Quality in Hong Kong. **School Effectiveness and School Improvement: An International Journal of Research, Policy, and Practice.** 10(1), 10-30.(The Netherlands)

Cheng, Y.C. (ed.) (1999b). **Education in the East South Asia**. Special Issue of *School Effectiveness and School Improvement: An International Journal of Research, Policy, and Practice.* 10(1) (The Netherlands)

Creemers, B., Peters, T. & Reynolds, D. (1989). **School effectiveness and school improvement**. Amsterdam: Swets & Zeitlinger.

Crosby, P.B. (1979). **Quality is free**. N.Y.: New American Library.

Education Commission (1984-1997), **Reports 1 to 7,** Hong Kong: the Government Printer.

Education and Manpower Branch and Education Department (1991). **The school management initiative: Setting the framework for quality in Hong Kong schools,** Hong Kong: Government Printer.

Education Ordinance, (1972). Hong Kong: The Hong Kong Government Printer.

Fraser,B.J. et al.(1987). Syntheses of educational productivity research. Special issue of the **International Journal of Educational Research**, 11, 2.73

French, J. R. P., & Raven, B. (1968). The bases of social power. In D. Cartwright & A. Zander (Eds.), **Group Dynamics** (3rd ed., pp. 259-269). NY: Harper & Row.

Fuller, B. (1986). Defining school quality. In J. Hannaway & M.E. Lockheed (eds.) **The contribution of the social science to educational policy and practice: 1965-1985**, (pp.33-69). C.A.: McCutchan Publishing Corporation,.

Gibson, S. & Dembo, M.H. (1984). Teacher efficacy: A construct validation. **Journal of Educational Psychology**, 76, 569-582.

Hage, J., & Aiken, M. (1967). Program change and organizational properties: A Comparative analysis. **American Journal of Sociology**, *72*, 503-519.

Halpin, A.W. (1966). **Theory and research in administration**. NY: Macmillan.

Halpin, A.W. & Croft, D.B. (1963). **The organizational climate of schools**. Chicago: Midwest Administration Center University of Chicago.

Herpen, M. van. (1989). Conceptual models in use for educational indicators. Paper presented at the General Assembly of the INES (International Education Indicators Project, CERI/OECD) in Semmering (Austria), Sept., 1989.

Ho, M.S. (1989). The effect of leadership behavior and use of power of Hong Kong secondary school teachers on classroom climate. **Educational Research Journal**, 4, 57-66.

Hopkins, D. & Leask, M. (1989). Performance indicators and school development. **School Organization,** 9(1), 3-20.

Hughes, P. (ed.) (1988). **The challenge of identifying and marketing quality in education.** Sydney: The Australian Association of Senior Educational Administrators.

Juran, J.M. (1988). **Juran's quality control handbook**, (4th ed.), N.Y.: McGraw-Hill.

Kyle, M.J. (ed) (1985). **Reaching for excellence: An effective schools source book**. Washington D.C.: U.S. Government Printing Office.

Matthes, W. A., Tollerud, T., & Langeveldt, W. (1989). Teacher efficacy: The relationship between the teacher and organizational characteristics. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, California, March 30.

Mortimore,P., et al.(1988). **School matters: the junior years**. Somerset: Open Books.

Mortimore, P.(1993). School effectiveness and the management of effective learning and teaching. Keynote speech presented at the International Congress of School Effectiveness and Improvement, Norrkoping, Sweden.

Moos, R. H., & Trickett, E. J. (1974). **Classroom environment scale manual**. Palo Alto, CA: Consulting Psychologists Press.

Mott, P.E. (1972). **The characteristics of effective organizations**. NY: Harper & Row.

Nuttall, D.L. (1990). The functions and limitations of international education indicators. Paper presented at the Annual Meeting of the American educational Research Association, Boston.

Oakes, J. (1986). Educational indicators, A guide for policy-makers. (Report No. OPE-01) (1-39). Center for Policy Research in Education.

Oldham, G.R. & Hackman, J.R. (1981). Relationships between organizational structure and employees reactions: Comparing alternative frameworks. **Administrative Science Quarterly**. 26, 66-83.

Price, J.L. & Mueller, C.M. (1986). **Handbook of organizational measurement**. New York: Pitman.

Queensland Department of Education (1992). **Collaborative School Development Planning and Review**, Queensland: Publishing Services for Review and Evaluation Directorate.

Scheerens, J., et al. (1988) **The feasibility of a system of educational indicators for primary and secondary education**. Enschede: University of Twente.

Scheerens, J. & Creemers, B.P.M. (eds) (1989). Developments in school effectiveness research. Special issue of the **International Journal of Educational Research**, Vol.13.

Scheerens, J. (1990). School Effectiveness research and the development of process indicators of school functioning. **School Effectiveness and School Improvement**, 1 (1), 61-80.

Scottish Office Education Department (1991). HM Inspectors of Schools. **The role of school development plans in managing school effectiveness**. Scotland: Education Department.

Scottish Office Education Department (1992). HM Inspectors of Schools. **Using performance indicators in primary/secondary school self-evaluation**. Scotland: Education Department.

Selden, R.W. (1990). Development educational indicators: a state-national perspective. In N.bottani & I. Defau (eds). Indicators of the quality of educational systems: an international perspective. **International Journal of Educational Research**.Vol.14.

Sergiovanni, T.J. (1984). Leadership and excellence in schooling, **Educational Leadership**, 41(5), 4-13.

Tenner, A.R. & Detoro, I.J. (1992). **Total quality management**. M.A.: Addision Wesley .

Walberg, H.J. (1984). Improving the productivity of American schools. **Educational Leadership**, 41, 19-27.

Wang, M.C. & Walberg, H.J. (1991). Teaching and educational effectiveness: Research synthesis and consensus from the field. In Waxman, H.C. & Waldberg, H.J. (eds.) **Effective Teaching: Current Research** (pp.81-104), San Francisco: McCutchan.

Wilson, B.L. & Corcoran, T.B. (1988). **Successful secondary schools**. London: The Falmer Press.

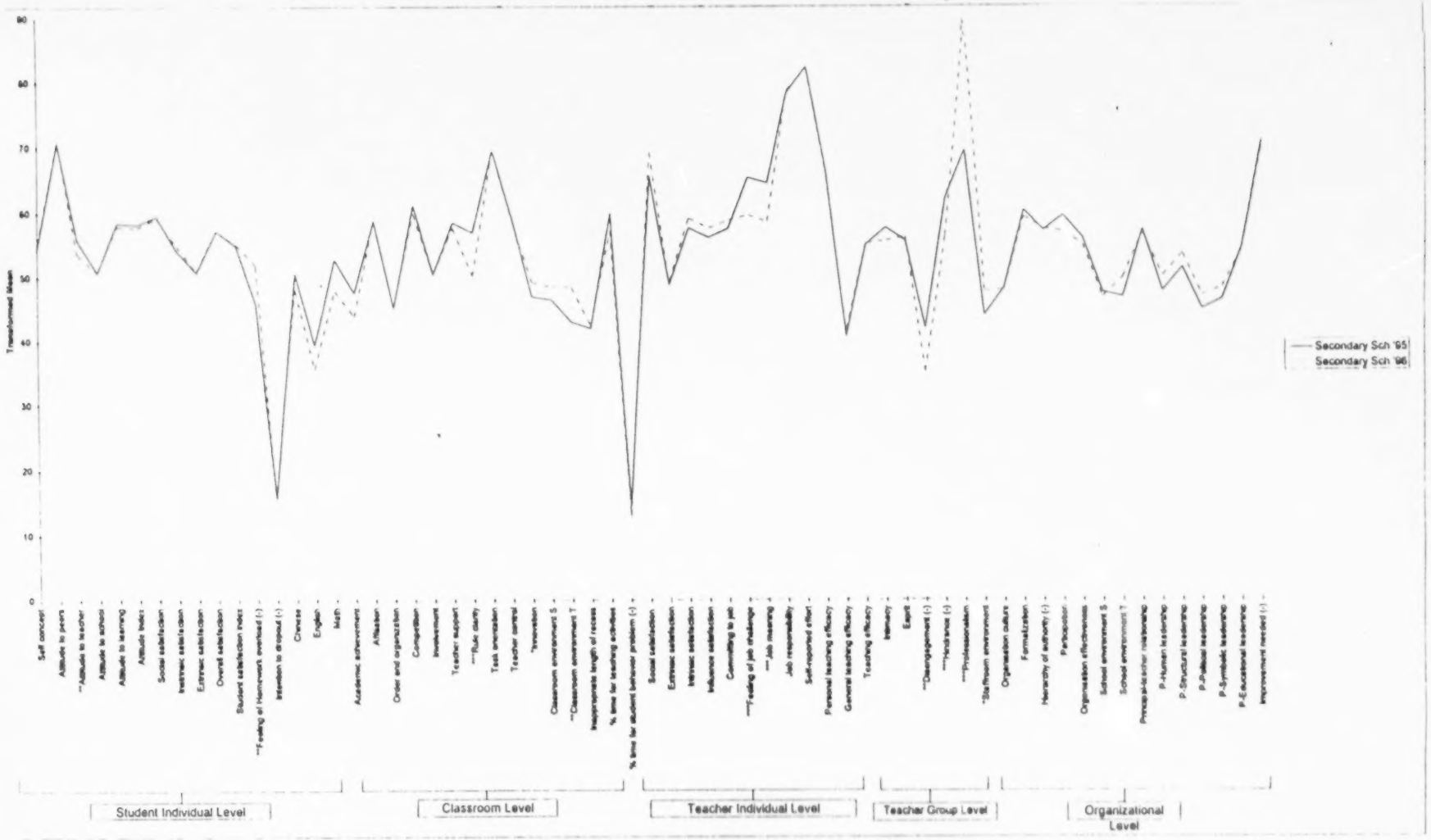
Windham, D.M. (1988). Effectiveness indicators in the economic analysis of educational activities. Special issue of the **International Journal of Educational Research**, 12(6), 575-665.

Woolfolk, A.E. & Hoy, W.K. (1990). Prospective teachers' sense of efficacy and belief about control. **Journal of Educational Psychology**, 82, 81-91.

---

*(The references listed below were mainly based on those used to develop the conception and instruments for the research project in 1991 and 1993; some may be outdated now)

Figure 1
The Stability of Education Quality Profiles of Secondary Schools



BEST COPY AVAILABLE

Figure 2
Education Quality Profile of Hong Kong Secondary Schools: By Transformed Means

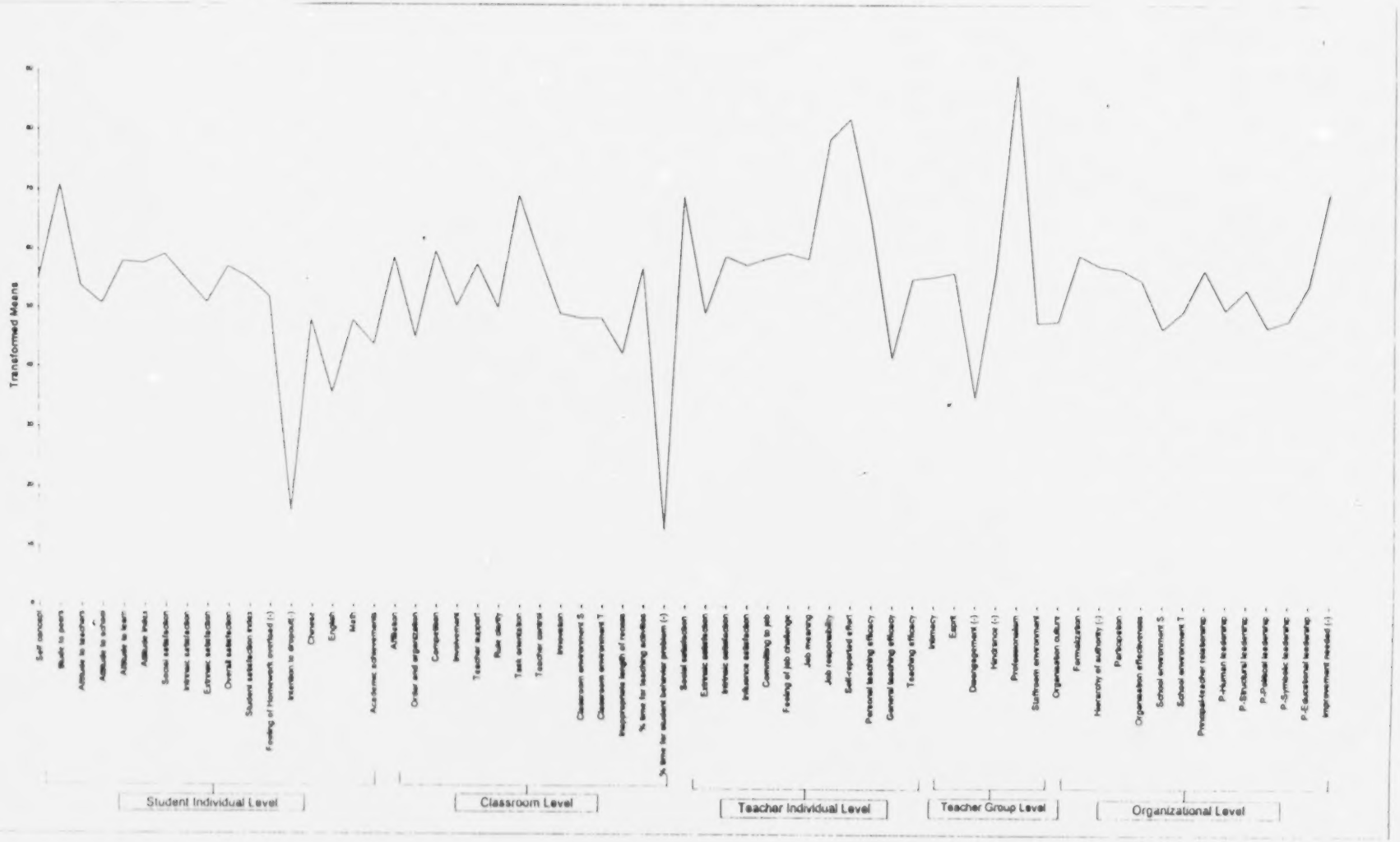
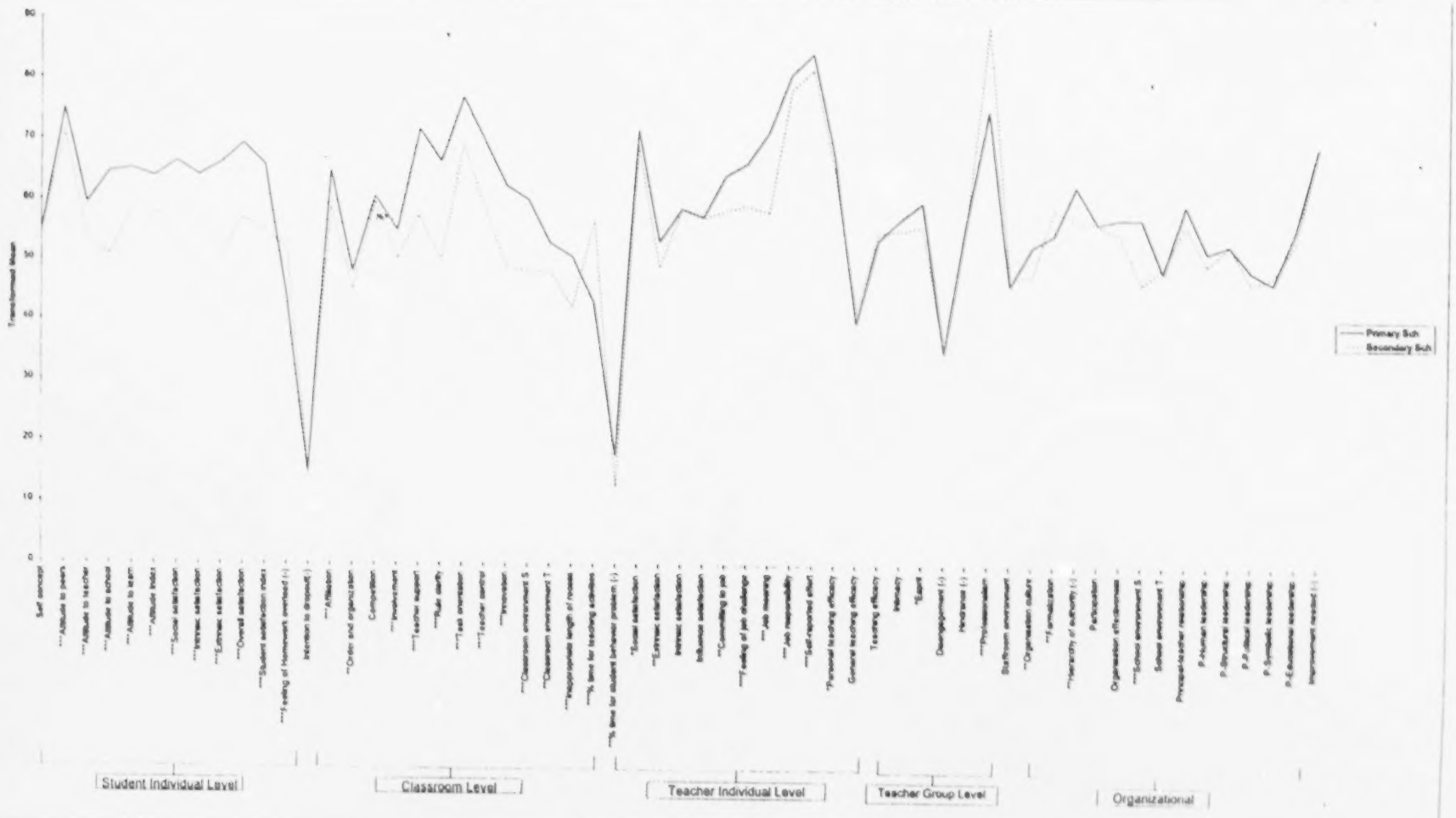


Figure 3
Comparison of Education Quality Profiles between Hong Kong Primary and Secondary Schools: By Transformed Means and Raw Means



BEST COPY AVAILABLE

Table 3
Comparison of Education Quality Profiles between Hong Kong Primary and Secondary Schools: By Transformed Means and Raw Means

Indicators	Mid-pt of Scale	Average School Means (Primary)	Average School Means (Secondary)	Transformed Means (Primary)	Transformed Means (Secondary)
<Student attitudes>					
Self concept	(3)	3.19	3.21	54.75	55.25
Attitude to peers***	(3)	4.00	3.84	75.00	71.00
Attitude to teachers***	(3)	3.38	3.15	59.50	53.75
Attitude to school***	(3)	3.59	3.03	64.75	50.75
Attitude to learn***	(3)	3.61	3.32	65.25	58.00
Attitude index***	(3)	3.56	3.31	64.00	57.75
<Student satisfaction>					
Social satisfaction***	(3)	3.66	3.37	66.50	59.25
Intrinsic satisfaction***	(3)	3.57	3.20	64.25	55.00
Extrinsic satisfaction***	(3)	3.65	3.04	66.25	51.00
Overall satisfaction***	(3)	3.78	3.29	69.50	57.25
Student satisfaction index***	(3)	3.64	3.21	66.00	55.25
<Negative feelings>					
Feeling of Homework overload (-) ***	(3)	2.77	3.08	44.25	52.00
Intention to dropout(-)	(3)	1.60	1.64	15.00	16.00
<Attainment test results>					
Chinese#	-	63.47	48.17	63.47	48.17
English#	-	46.22	35.71	46.22	35.71
Math#	-	21.57	47.99	56.76	47.99
Academic achievement#	-	55.33	43.96	55.33	43.96
<Classroom climate>					
Affiliation***	(3)	3.61	3.36	65.25	59.00
Order and organization**	(3)	2.93	2.81	48.25	45.25
Competition	(3)	3.44	3.40	61.00	60.00
Involvement***	(3)	3.21	3.02	55.25	50.50
Teacher support***	(3)	3.88	3.31	72.00	57.75
Rule clarity***	(3)	3.67	3.01	66.75	50.25
Task orientation***	(3)	4.09	3.78	77.25	69.50
Teacher control***	(3)	3.80	3.36	70.00	59.00
Innovation***	(3)	3.51	2.97	62.75	49.25

Indicators	Mid-pt of Scale	Average School Means (Primary)	Average School Means (Secondary)	Transformed Means (Primary)	Transformed Means (Secondary)
<Quality of classroom physical environment>					
Perceived by students***	(3)	3.42	2.94	60.50	48.50
Perceived by teachers***	(3)	3.13	2.94	53.25	48.50
<Classroom arrangements>					
Appropriate length of recess***	(3)	3.04	2.70	51.00	42.50
% time for teaching activities***	(3)	2.73	3.29	43.25	57.25
% time for student behavior problem (-)**	(3)	1.72	1.52	18.00	13.00
<Teacher job satisfaction>					
Social satisfaction *	(4)	5.33	5.16	72.17	69.33
Extrinsic satisfaction**	(4)	4.22	3.96	53.67	49.33
Intrinsic satisfaction	(4)	4.55	4.55	59.17	59.17
Influence satisfaction	(4)	4.47	4.46	57.83	57.67
<Teacher job attitude>					
Committing to job**	(4)	4.88	4.53	64.67	58.83
Feeling of job challenge***	(4)	5.00	4.58	66.67	59.67
Job meaning***	(4)	5.32	4.52	72.00	58.67
Job responsibility***	(4)	5.88	5.72	81.33	78.67
Self-reported effort***	(4)	6.09	5.93	84.83	82.17
<Teacher efficacy>					
Personal teaching efficacy*	(3)	3.71	3.62	67.75	65.50
General teaching efficacy	(3)	2.60	2.67	40.00	41.75
Teaching efficacy	(3)	3.16	3.21	54.00	55.25
<Social norms>					
Intimacy	(4)	4.45	4.34	57.50	55.67
Esprit*	(4)	4.62	4.38	60.33	56.33
Disengagement (-)	(4)	3.12	3.11	35.33	35.17
Hindrance (-)	(4)	4.42	4.38	57.00	56.33
<Professionalism>* **	(4)	5.53	6.38	75.50	89.67

Indicators	Mid-pt of Scale	Average School Means (Primary)	Average School Means (Secondary)	Transformed Means (Primary)	Transformed Means (Secondary)
<Perceived quality of physical environment of staff room >	(3)	2.86	2.91	46.50	47.75
<Strength of organisation culture>**	(3)	3.12	2.92	53.00	48.00
<Organisation structure>					
Formalization**	(4)	4.30	4.56	55.00	59.33
Hierarchy of authority (-)**	(4)	4.79	4.45	63.17	57.50
Participation	(4)	4.42	4.42	57.00	57.00
<Organisation effectiveness>	(3)	3.31	3.20	57.75	55.00
<Quality of school physical environment>					
Perceived by students***	(3)	3.31	2.87	57.75	46.75
Perceived by teachers	(3)	2.95	2.99	48.75	49.75
<Principal-teacher relationship>	(4)	4.61	4.41	60.17	56.83
<Principal leadership>					
Human leadership	(4)	4.13	4.00	52.17	50.00
Structural leadership	(4)	4.21	4.21	53.50	53.50
Political leadership	(4)	3.94	3.82	49.00	47.00
Symbolic leadership	(4)	3.82	3.89	47.00	48.17
Educational leadership	(4)	4.37	4.25	56.17	54.17
<Improvement needed (-)>	(4)	5.19	5.20	69.83	70.00

Note:

T-test is performed to test the difference of each indicators, except Chinese, English, Maths and Academic achievements, between primary and secondary schools.

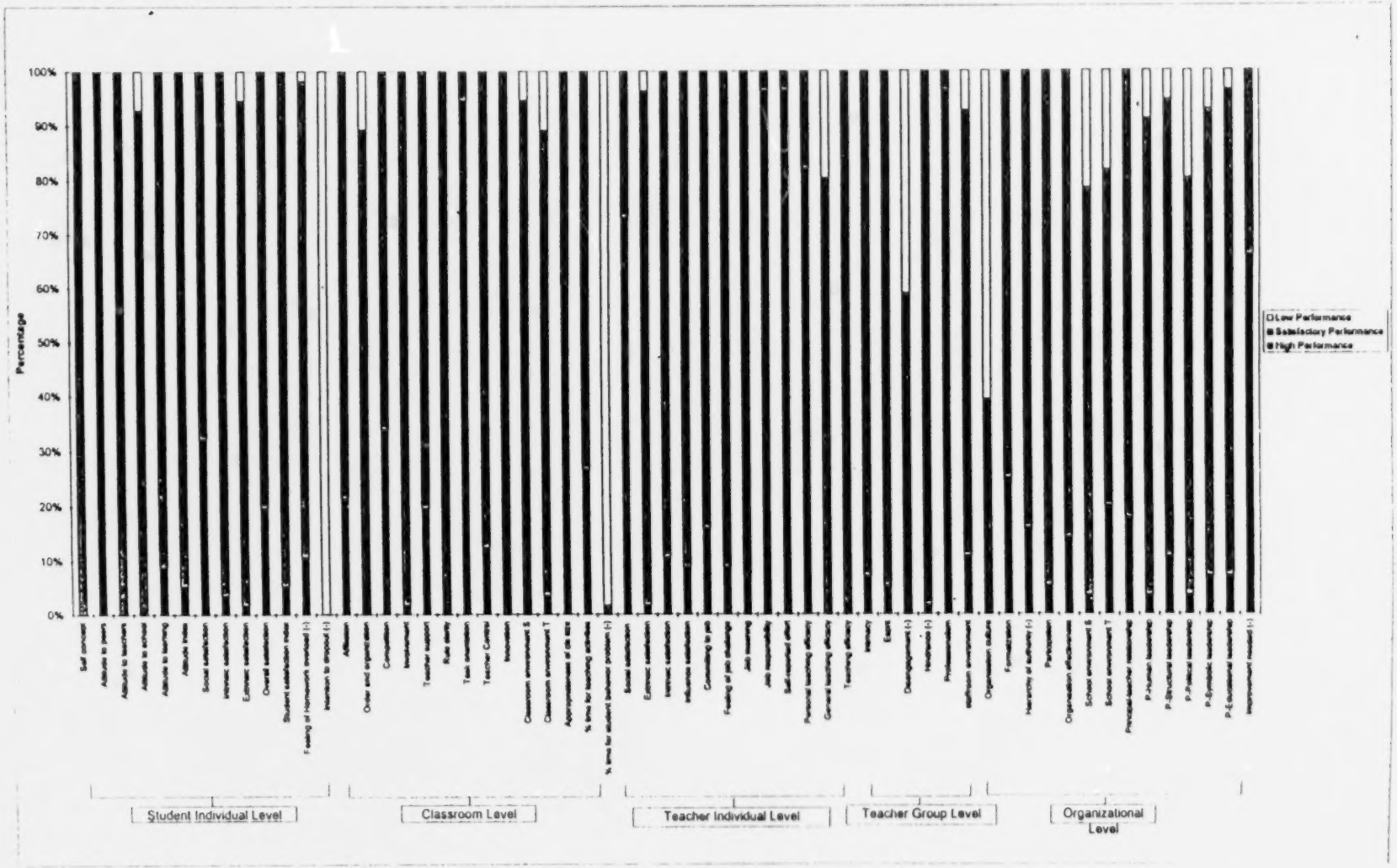
* $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

\# The full mark of these aptitude test is 20. The mark has already transformed by proportion to 100. The difference of these four variables, Chinese, English, Maths and Academic Achievements, between primary and secondary schools are not being tested. It was because the two sets of the aptitude tests are completely different in the study.

1,2,3,4,5 represents 0%, 25%, 50%, 75% and 100% of class time used for teaching activities respectively

1,2,3,4,5 represents 0%, 25%, 50%, 75% and 100% of class time used for student problems respectively

Figure 4a
Profile of Process and Outcome Indicators of Hong Kong Secondary Schools:
By % of School in High, Satisfactory, and Low Performance



BEST COPY AVAILABLE

Figure 4b
Profile of Contextual Indicators of Hong Kong Secondary Schools:
By % of School in High, Satisfactory, and Low Performance

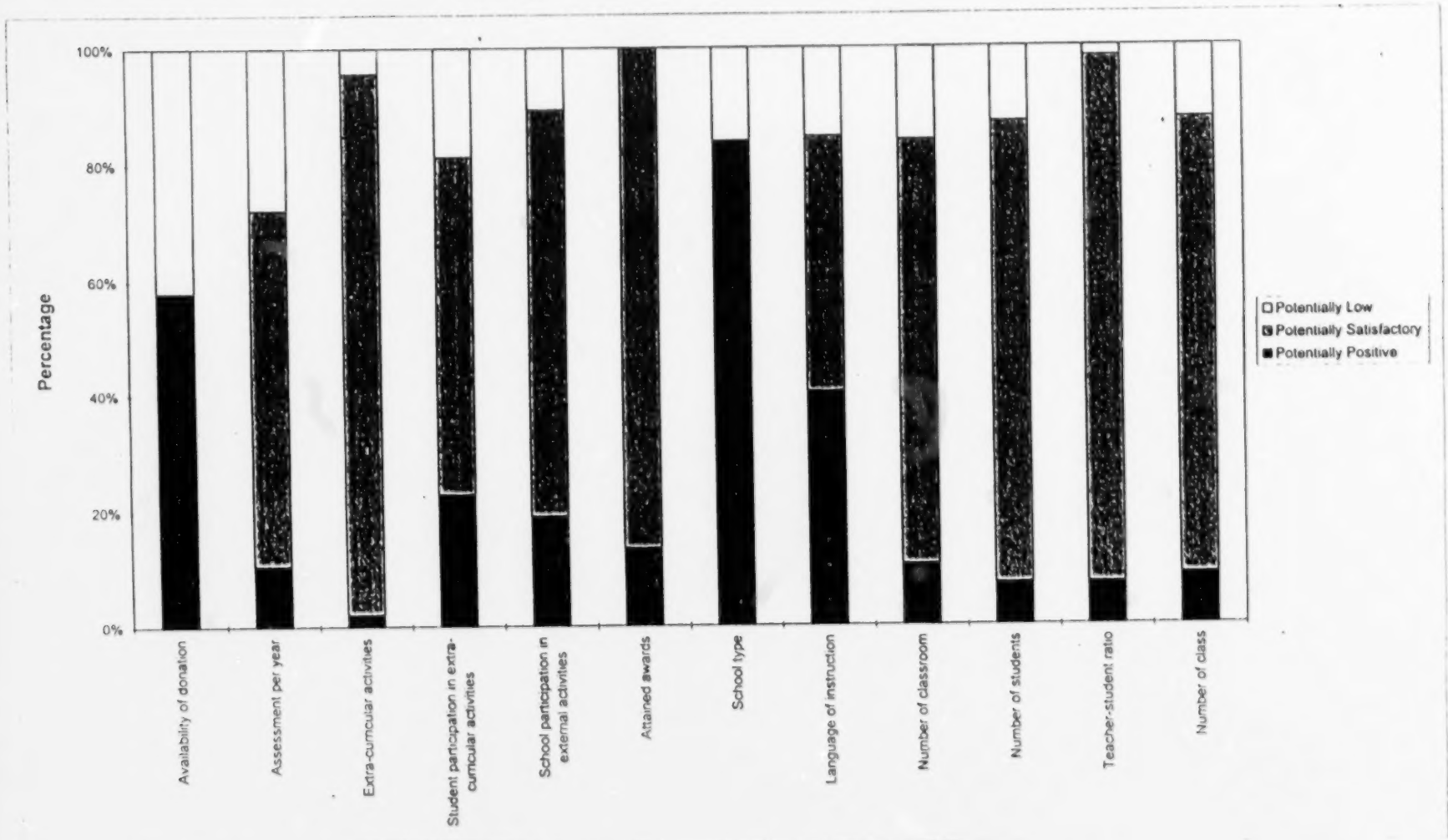


Table 4a.
Profile of Process and Outcome Indicators of Hong Kong Secondary Schools: By % of School in High, Satisfactory, and Low Performance

Indicators	Average School Means	Mid-point of Scale	High Performance ■	Satisfactory Performance ▣	Low Performance □
<Student attitudes>					
Self concept	3.21	(3)	0.00	100.00	0.00
Attitude to peers	3.84	(3)	100.00	0.00	0.00
Attitude to teachers	3.15	(3)	0.00	100.00	0.00
Attitude to school	3.03	(3)	0.00	92.86	7.14
Attitude to learning	3.32	(3)	8.93	91.07	0.00
Attitude Index	3.31	(3)	5.36	94.64	0.00
<Student satisfaction>					
Social satisfaction	3.37	(3)	32.14	67.86	0.00
Intrinsic satisfaction	3.2	(3)	3.57	96.43	0.00
Extrinsic satisfaction	3.04	(3)	1.79	92.86	5.36
Overall satisfaction	3.29	(3)	19.64	80.36	0.00
Student satisfaction index	3.21	(3)	5.36	94.64	0.00
<Negative feelings>					
Feeling of Homework overload (-)	3.08	(3)	10.71	87.50	1.79
Intention to dropout (-)	1.64	(3)	0.00	0.00	100.00
<Attainment test results>					
Chinese#	48.17	-	-	-	-
English#	35.71	-	-	-	-
Math#	47.99	-	-	-	-
Academic achievement#	43.96	-	-	-	-
<Classroom climate>					
Affiliation	3.36	(3)	21.43	78.57	0.00
Order and organization	2.81	(3)	0.00	89.29	10.71
Competition	3.4	(3)	33.93	66.07	0.00
Involvement	3.02	(3)	1.79	98.21	0.00
Teacher support	3.31	(3)	19.64	80.36	0.00
Rule clarity	3.01	(3)	0.00	100.00	0.00
Task orientation	3.78	(3)	94.64	5.36	0.00
Teacher Control	3.36	(3)	12.50	87.50	0.00
Innovation	2.97	(3)	0.00	100.00	0.00

Indicators	Average School Means	Mid-point of Scale	High Performance ■	Satisfactory Performance ▣	Low Performance □
<Quality of classroom physical environment>					
Perceived by students	2.94	(3)	0.00	94.64	5.36
Perceived by teachers	2.94	(3)	3.64	85.45	10.91
<Classroom arrangements>					
Appropriateness of class size	2.7	(3)	60.71	39.29	0.00
% time for teaching activities**	3.29	(3)	26.79	73.21	0.00
% time for student behavior problem (-)***	1.52	(3)	0.00	1.79	98.21
<Teacher job satisfaction>					
Social satisfaction	5.16	(4)	73.21	26.79	0.00
Extrinsic satisfaction	3.96	(4)	1.82	96.36	1.82
Intrinsic satisfaction	4.55	(4)	10.71	89.29	0.00
Influence satisfaction	4.46	(4)	8.93	91.07	0.00
<Teacher job attitude>					
Committing to job	4.53	(4)	16.07	83.93	0.00
Feeling of job challenge	4.58	(4)	8.93	91.07	0.00
Job meaning	4.52	(4)	7.14	92.86	0.00
Job responsibility	5.72	(4)	96.43	3.57	0.00
Self-reported effort	5.93	(4)	96.43	3.57	0.00
<Teacher efficacy>					
Personal teaching efficacy	3.62	(3)	82.14	17.86	0.00
General teaching efficacy	2.67	(3)	0.00	80.36	19.64
Teaching efficacy	3.21	(3)	0.00	100.00	0.00
<Social norms>					
Intimacy	4.34	(4)	7.14	92.86	0.00
Esprit	4.38	(4)	5.36	94.64	0.00
Disengagement (-)	3.11	(4)	0.00	58.93	41.07
Hindrance (-)	4.38		1.79	98.21	0.00
<Professionalism>	6.38	(4)	96.43	3.57	0.00
<Perceived quality of physical environment of staff room >	2.91	(3)	10.91	81.82	7.27
<Strength of organisation culture>	2.92	(3)	0.00	39.29	60.71

Indicators	Average School Means	Mid-point of Scale	High Performance ■	Satisfactory Performance ▣	Low Performance □
<Organisation structure>					
Formalization	4.56	(4)	25.00	75.00	0.00
Hierarchy of authority (-)	4.45	(4)	16.07	83.93	0.00
Participation	4.42	(4)	5.36	94.64	0.00
<Organisation effectiveness>	3.2	(3)	14.29	85.71	0.00
<Quality of school physical environment>					
Perceived by students	2.87	(3)	3.57	75.00	21.43
Perceived by teachers	2.99	(3)	20.00	61.81	18.18
<Principal-teacher relationship>	4.41	(4)	17.86	82.14	0.00
<Principal leadership>					
Human leadership	4	(4)	3.57	87.50	8.93
Structural leadership	4.21	(4)	10.71	83.93	5.36
Political leadership	3.82	(4)	3.57	76.79	19.64
Symbolic leadership	3.89	(4)	7.14	85.71	7.14
Educational leadership	4.25	(4)	7.14	89.29	3.57
<Improvement needed (-)>	5.2	(4)	66.07	33.93	0.00

Note:

■ High performance is defined by the value of school mean larger than or equal to 3.5 (for 5-point scale indicators) or 5 (for 7-point scale indicators).

□ Low performance is defined by the value of school mean less than or equal to 2.5 (for 5-point scale indicators) or 3 (for 7-point scale indicators).

▣ Satisfactory performance is defined by the value between high and low performance.

\# The full mark of these aptitude test is 20. The mark has already transformed by proportion to 100. Since the aptitude test of chinese, english and mathematics are specially designed for this survey, thus, we do not get the mean scores of all secondary schools in Hong Kong. Hence, the performance of the secondary school cannot be defined as in primary school.

1,2,3,4,5 represents 0%, 25%, 50%, 75% and 100% of class time used for teaching activities respectively

1,2,3,4,5 represents 0%, 25%, 50%, 75% and 100% of class time used for student problems respectively

Table 4b.
Profile of Contextual Indicators of Hong Kong Secondary Schools: By % of School in Potentially Positive Performance

Selected Contextual Indicators	Means	Standard Deviation	Potentially Positive ■	Potentially Satisfactory ▣	Potentially Low □
1. Availability of donation	-	-	58.00	0.00	42.00
2. Assessment per year (-)	1.26	0.65	10.64	61.70	27.66
3. Extra-curricular activities	33.63	20.28	2.17	93.48	4.35
4. Percentage of student participation in extra-curricular activities	72.54	23.7	22.92	58.33	18.75
5. School participation in external activities	29.46	22.24	19.15	70.21	10.64
6. Attained awards	30.08	36.16	13.64	86.36	0.00
7. School type	-	-	83.93	0.00	16.07
8. Medium of instruction	-	-	40.38	44.23	15.38
9. Number of classrooms	25.04	6.40	10.71	73.21	16.07
10. Number of students	1095.67	236.22	7.41	79.63	12.96
11. Teacher-student ratio	0.05	0.01	7.41	90.74	1.85
12. Number of class	28.93	6.32	8.93	78.57	12.50

- ■ Potentially positive performance of school outcome at student or teacher level
- ▣ Potentially satisfactory performance of school outcome at student or teacher level
- □ Potentially low performance of school outcome at student or teacher level

For continuous variables,

The school is defined as potentially positive performance if it gets the 1.5 standard deviation above the mean

The school is defined as potentially low performance if it gets 1.5 standard deviation below the mean. For details, please refer to notes on the next page.

For categorical variables,

Potentially positive performance is defined by results of ANOVA analysis. For details, please refer to notes on the next page.

Note

1. ■ if there are donation to the school
   ☐ if there are no donation to the school

2. ■ if there are less than 0.61 assessment per year
   ■ if there are more than 0.61 assessment but less than 1.91 assessment per year
   ☐ if there are more than 1.91 assessment per year

3. ■ if there are more than 53.91 extra-curricular activities in school
   ■ if there are more than 13.35 but less than 53.91 extra-curricular activities in school
   ☐ if there are less than 13.35 extra-curricular activities in school

4. ■ if more than 96.24% of students participated in extra-curricular activities
   ■ if there are more than 48.84% but less than 96.24% of students participated in extra-curricular activities
   ☐ if there are less than 48.84% of students participated in extra-curricular activities

5. ■ if the school has participated more than 51.70 external activities
   ■ if the school has participated more than 7.22 but less than 51.70 external activities
   ☐ if the school has participated less than 7.22 external activities

6. ■ if the school has got more than 66.24 awards per year
   ■ if the school has got an awards but less than 66.24 awards per year
   ☐ if the school has not got any awards

7. ■ if it is a grammar school
   ☐ if it is not a grammar school

8. ■ if the medium of instruction is english
   ■ if the medium of instruction is mixed
   ☐ if the medium of instruction is chinese

9. ■ if there are more than 31.44 classrooms
   ■ if there are more than 18.64 but less than 31.44 classrooms
   ☐ if there are less than 18.64 classrooms

10. ■ if there are more 1331.89 students
    ■ if there are more than 859.45 but less than 1331.89 students
    ☐ if there are less than 859.45 students

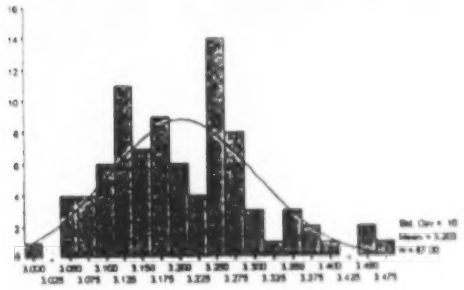
11. ■ if teacher-student ratio is more than 0.06
    ■ if teacher-student ratio is more than 0.04 but less than 0.06
    ☐ if teacher student ratio is less than 0.04

12. ■ if number of class is more than 35.25
    ■ if number of class is more than 22.61 but less than 35.25
    ☐ if number of class is less than 22.61

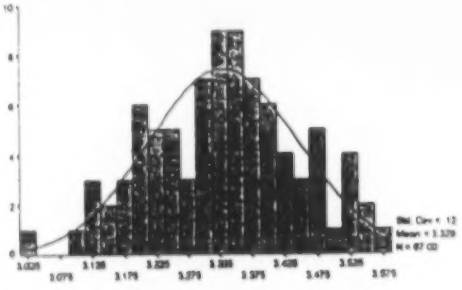
Figure 5.
Distribution of Hong Kong Secondary Schools on Each Indicator of Process and Outcome

(The x-axis represents the raw score of the indicators while, the y-axis represents frequency.)

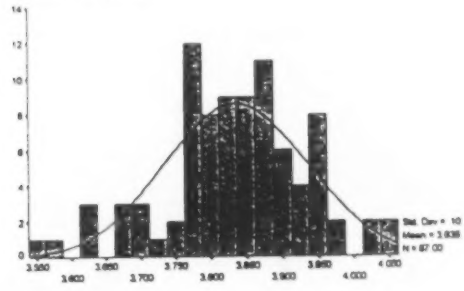
Self Concept



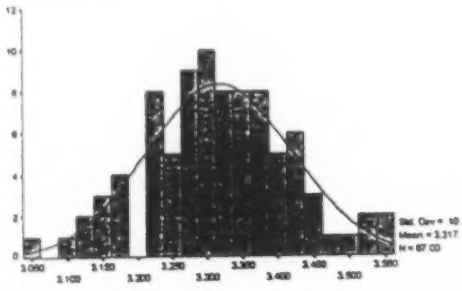
Attitude to learn



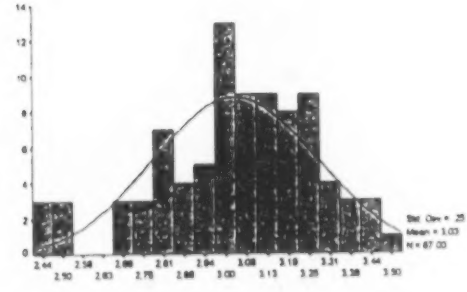
Attitude to peers



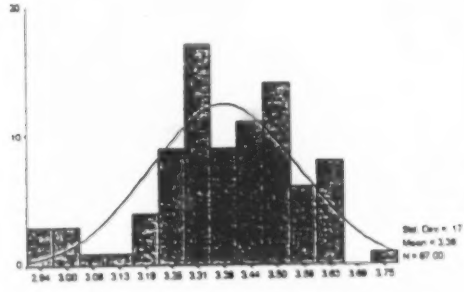
Attitude index



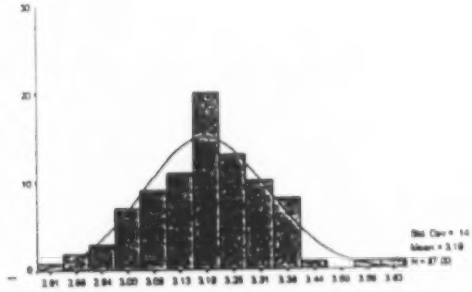
Attitude to schools



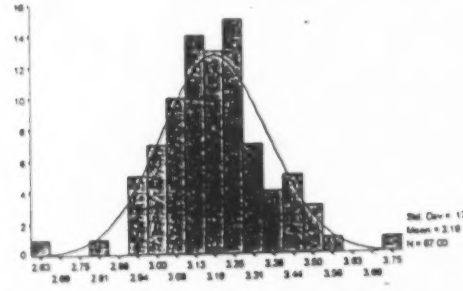
Social satisfaction



Attitude to teachers

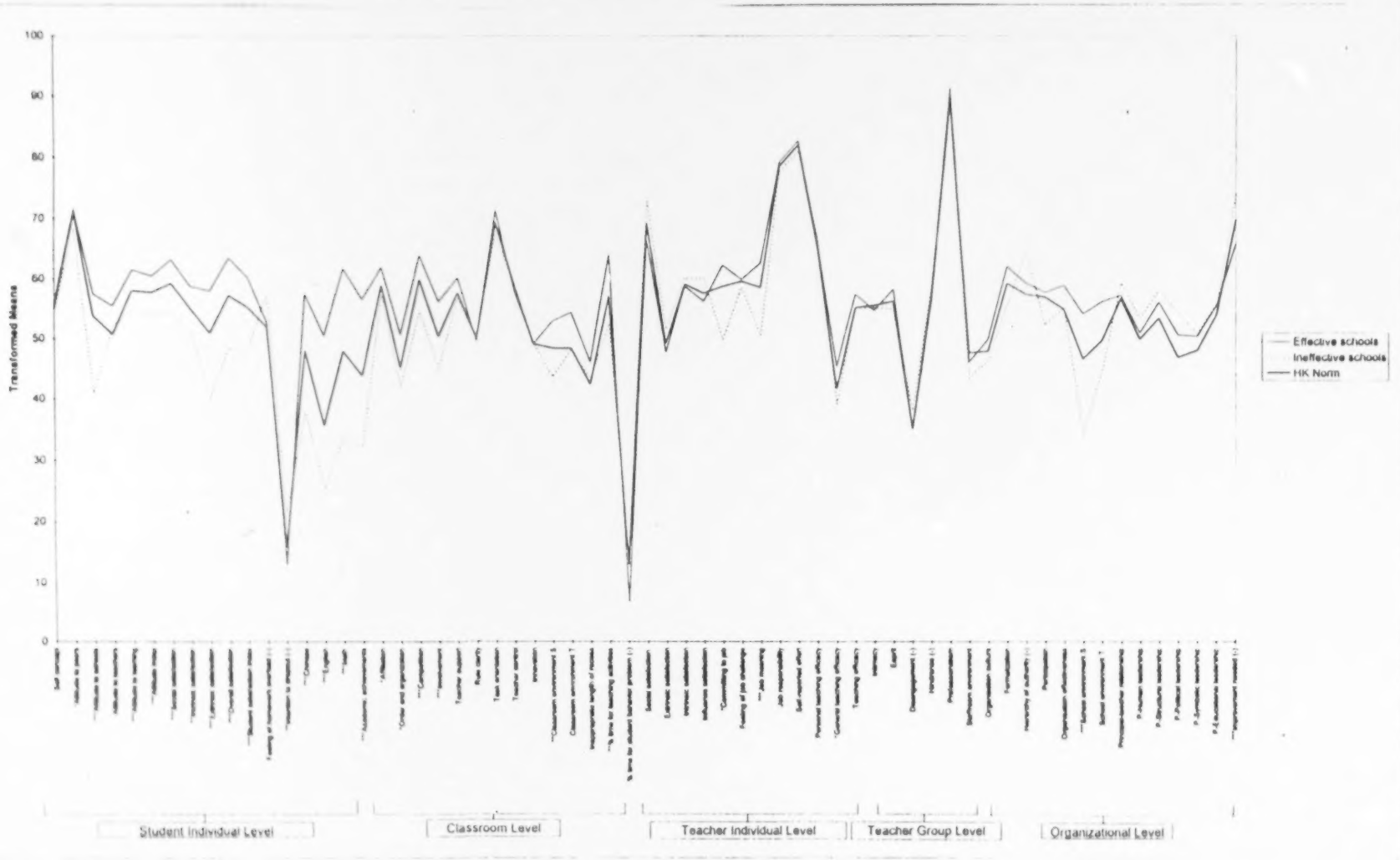


Intrinsic satisfaction



BEST COPY AVAILABLE

Figure 6
Characteristics of Effective and Ineffective Secondary Schools in Process and Out come



BEST COPY AVAILABLE

Table 5
Characteristics of Effective and Ineffective Secondary Schools in Process and Outcome

Indicators	Mid-pt of Scale	Average School Means (Effective)	Average School Means (In-effective)	Average School Means (HK Norm)	Transformed Means (Effective)	Transformed Means (In-effective)	Transformed Means (HK Norm)
<Student attitudes>							
Self concept	(3)	3.25	3.18	3.21	56.25	54.50	55.25
Attitude to peers*	(3)	3.87	3.73	3.84	71.75	68.25	71.00
Attitude to school***	(3)	3.3	2.64	3.15	57.50	41.00	53.75
Attitude to teachers	(3)	3.22	3.08	3.03	55.50	52.00	50.75
Attitude to learn***	(3)	3.46	3.19	3.32	61.50	54.75	58.00
Attitude Index***	(3)	3.42	3.17	3.31	60.50	54.25	57.75
<Student satisfaction>							
Social satisfaction***	(3)	3.53	3.18	3.37	63.25	54.50	59.25
Intrinsic satisfaction**	(3)	3.35	3.04	3.2	58.75	51.00	55.00
Extrinsic satisfaction***	(3)	3.32	2.61	3.04	58.00	40.25	51.00
Overall satisfaction***	(3)	3.54	2.94	3.29	63.50	48.50	57.25
Student satisfaction index***	(3)	3.41	2.94	3.21	60.25	48.50	55.25
<Negative feelings>							
Feeling of Homework overload (-)	(3)	3.11	3.29	3.08	52.75	57.25	52.00
Intention to dropout(-)**	(3)	1.52	1.87	1.64	13.00	21.75	16.00
<Attainment test results>							
Chinese***#	-	57.53	37.77	48.17	57.53	37.77	48.17
English***#	-	50.56	25.49	35.71	50.56	25.49	35.71
Math***#	-	61.75	33.55	47.99	61.75	33.55	47.99
Academic achievement***#	-	56.61	32.27	43.96	56.61	32.27	43.96
<Classroom climate>							
Affiliation*	(3)	3.48	3.29	3.36	62.00	57.25	59.00
Order and organization*	(3)	3.03	2.69	2.81	50.75	42.25	45.25
Competition***	(3)	3.56	3.18	3.4	64.00	54.50	60.00
Involvement***	(3)	3.25	2.81	3.02	56.25	45.25	50.50
Teacher support	(3)	3.41	3.27	3.31	60.25	56.75	57.75
Rule clarity	(3)	2.99	3.01	3.01	49.75	50.25	50.25
Task orientation	(3)	3.86	3.7	3.78	71.50	67.50	69.50
Teacher control	(3)	3.32	3.35	3.36	58.00	58.75	59.00
Innovation	(3)	2.97	2.97	2.97	49.25	49.25	49.25

Indicators	Mid-pt of Scale	Average School Means (Effective)	Average School Means (In-effective)	Average School Means (HK Norm)	Transformed Means (Effective)	Transformed Means (In-effective)	Transformed Means (HK Norm)
<Quality of classroom physical environment>							
Perceived by students**	(3)	3.12	2.75	2.94	53.00	43.75	48.50
Perceived by teachers	(3)	3.18	2.93	2.94	54.50	48.25	48.50
<Classroom arrangements>							
Appropriate length of recess	(3)	2.85	2.74	2.7	46.25	43.50	42.50
% time for teaching activities***	(3)	3.57	3.1	3.29	64.25	52.50	57.25
% time for student behavior problem (-)***	(3)	1.27	1.58	1.52	6.75	14.50	13.00
<Teacher job satisfaction>							
Social satisfaction	(4)	4.99	5.39	5.16	66.50	73.17	69.33
Extrinsic satisfaction	(4)	3.87	4.1	3.96	47.83	51.67	49.33
Intrinsic satisfaction	(4)	4.53	4.61	4.55	58.83	60.17	59.17
Influence satisfaction	(4)	4.38	4.61	4.46	56.33	60.17	57.67
<Teacher job attitude>							
Committing to job*	(4)	4.74	4	4.53	62.33	50.00	58.83
Feeling of job challenge	(4)	4.6	4.52	4.58	60.00	58.67	59.67
Job meaning***	(4)	4.76	4.04	4.52	62.67	50.67	58.67
Job responsibility	(4)	5.76	5.67	5.72	79.33	77.83	78.67
Self-reported effort	(4)	5.97	5.86	5.93	82.83	81.00	82.17
<Teacher efficacy>							
Personal teaching efficacy	(3)	3.66	3.7	3.62	66.50	67.50	65.50
General teaching efficacy*	(3)	2.82	2.57	2.67	45.50	39.25	41.75
Teaching efficacy	(3)	3.3	3.21	3.21	57.50	55.25	55.25
<Social norms>							
Intimacy	(4)	4.29	4.32	4.34	54.83	55.33	55.67
Esprit	(4)	4.5	4.3	4.38	58.33	55.00	56.33
Disengagement (-)	(4)	3.12	3.29	3.11	35.33	38.17	35.17
Hindrance (-)	(4)	4.43	4.51	4.38	57.17	58.50	56.33
<Professionalism>	(4)	6.49	6.31	6.38	91.50	88.50	89.67

Indicators	Mid-pt of Scale	Average School Means (Effective)	Average School Means (In-effective)	Average School Means (HK Norm)	Transformed Means (Effective)	Transformed Means (In-effective)	Transformed Means (HK Norm)
<Perceived quality of physical environment of staff room >	(3)	2.85	2.74	2.91	46.25	43.50	47.75
<Strength of organisation culture>	(3)	3	2.86	2.92	50.00	46.50	48.00
<Organisation structure>							
Formalization	(4)	4.73	4.35	4.56	62.17	55.83	59.33
Hierarchy of authority (-)	(4)	4.56	4.87	4.45	59.33	64.50	57.50
Participation	(4)	4.47	4.14	4.42	57.83	52.33	57.00
<Organisation effectiveness>	(3)	3.36	3.21	3.2	59.00	55.25	55.00
<Quality of school physical environment>							
Perceived by students***	(3)	3.17	2.37	2.87	54.25	34.25	46.75
Perceived by teachers	(3)	3.25	2.79	2.99	56.25	44.75	49.75
<Principal-teacher relationship>	(4)	4.44	4.56	4.41	57.33	59.33	56.83
<Principal leadership>							
Human leadership	(4)	4.06	4.21	4	51.00	53.50	50.00
Structural leadership	(4)	4.37	4.48	4.21	56.17	58.00	53.50
Political leadership	(4)	4.04	4.26	3.82	50.67	54.33	47.00
Symbolic leadership	(4)	4.03	4.06	3.89	50.50	51.00	48.17
Educational leadership	(4)	4.34	4.35	4.25	55.67	55.83	54.17
<Improvement needed (-)>* **	(4)	4.96	5.46	5.2	66.00	74.33	70.00

Note:

1. The school with standard score of either outcome indicators (i.e. Attitude index, Satisfaction index or Academic Achievement) greater than or equal to 1.5 is defined as Effective School. The number of effective schools is 10.
2. The school with standard score of either outcome indicators (i.e. Attitude index, Satisfaction index or Academic Achievement) less than or equal to 1.5 is defined as Ineffective School. The number of ineffective schools is 8.
3. T-test is performed to test the difference of each indicators, between the Effective School and Ineffective School.

   * $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$

\# The full mark of these aptitude test is 20. The mark has already been transformed by proportion to 100.
1,2,3,4,5 represents 0%, 25%, 50%, 75% and 100% of class time used for teaching activities respectively
1,2,3,4,5 represents 0%, 25%, 50%, 75% and 100% of class time used for student problems respectively